

Aneka Tutorial

By Xiangqiang Xu

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1. Aneka platform download: see the attached **Aneka.3.0.msi**.

Or you can register online and download from the following link:

http://www.manjrasoft.com/manjrasoft_registration.php

The installation guide is available to download here:

(I suggest you use the latest version: Aneka 3.0 which is a free evaluation version)

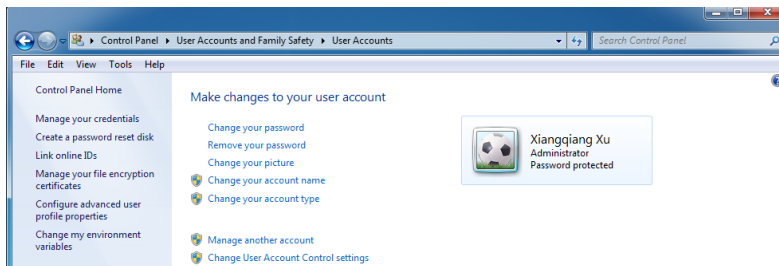
<http://www.manjrasoft.com/download/3.0/AnekaInstallationGuide.pdf>

Aneka User Documents & Programming Model Example Code:

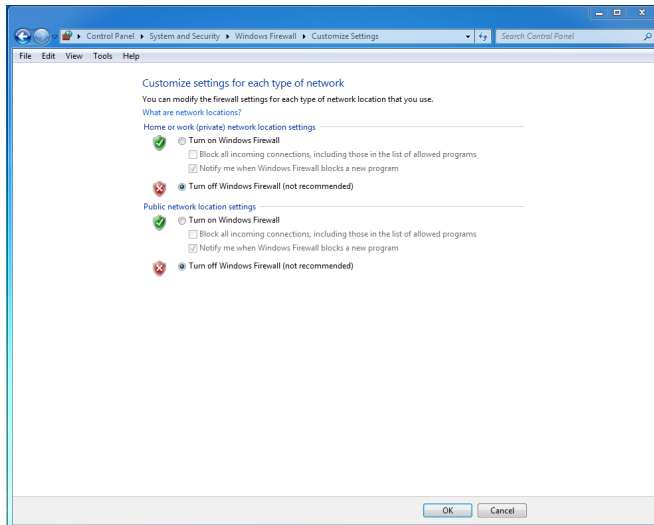
http://www.manjrasoft.com/manjrasoft_downloads.html

2. Use windows 7/8, or Windows Server 2008/2012 as your OS environment.

3. Before installation, make sure that you are a full control administrator, looks like this:

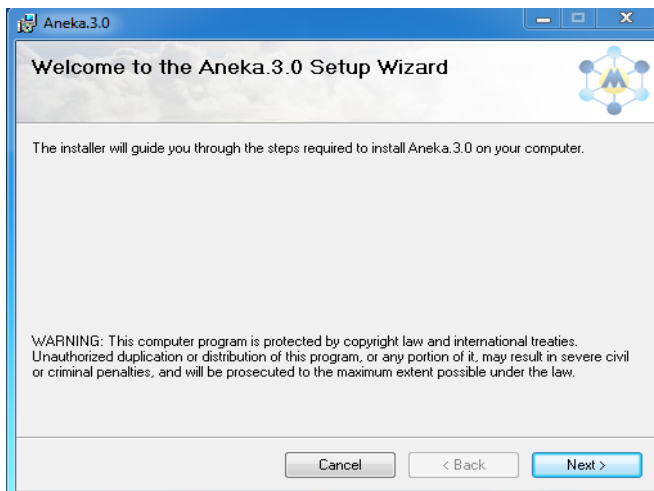


Turn off your firewall on both private network and public network as well:

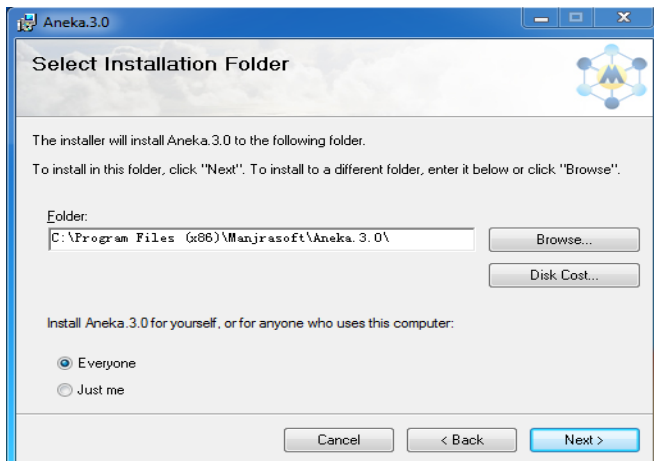


4. Installation Steps:

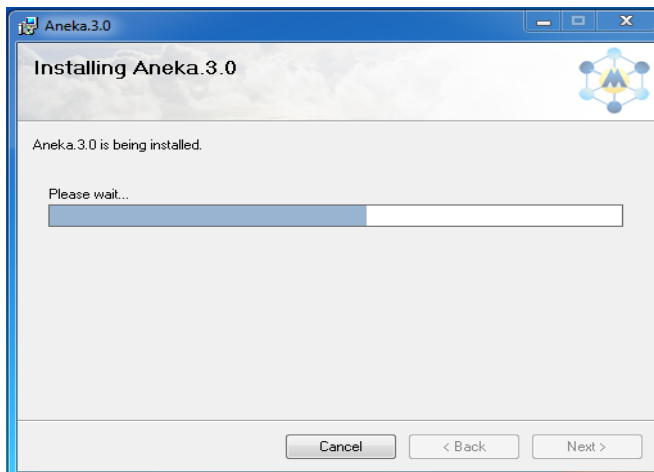
Double click **Aneka.3.3.msi**, and then this should show up:



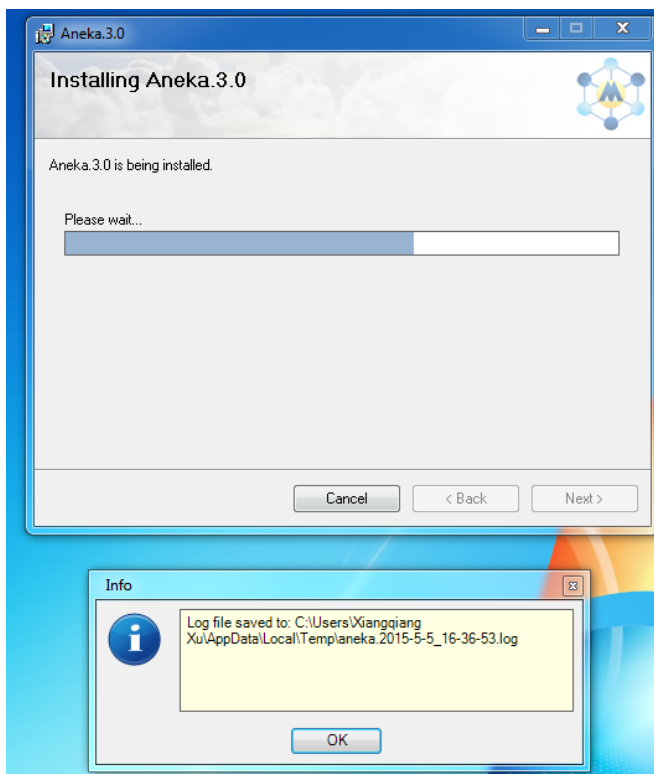
Click Next, I recommend you choose **Everyone** instead of **Just Me**.



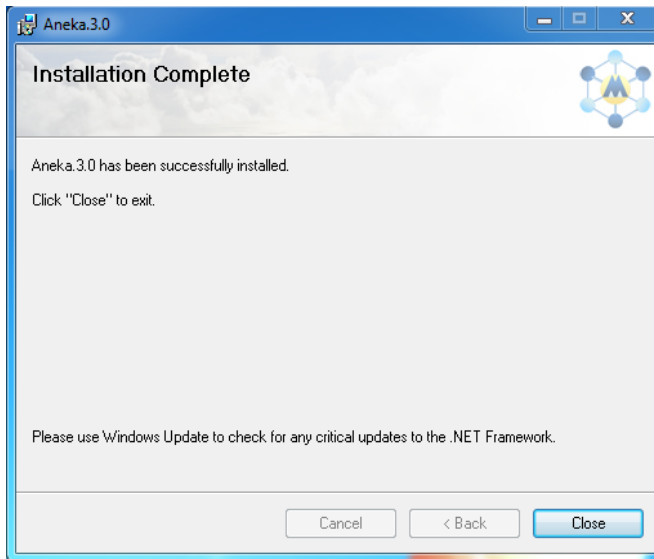
Click Next, and wait for installation, it might take couple of seconds:



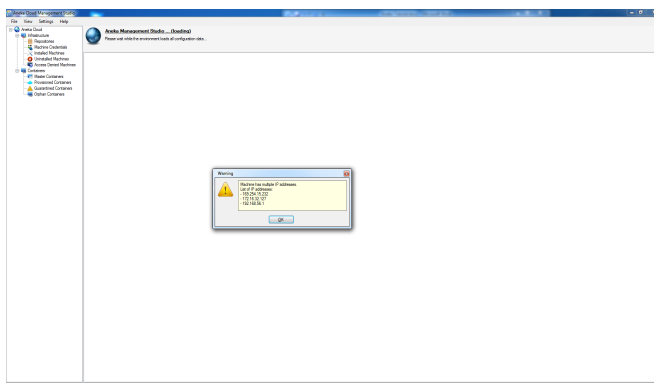
When the **Info** form pops up, click **OK**:



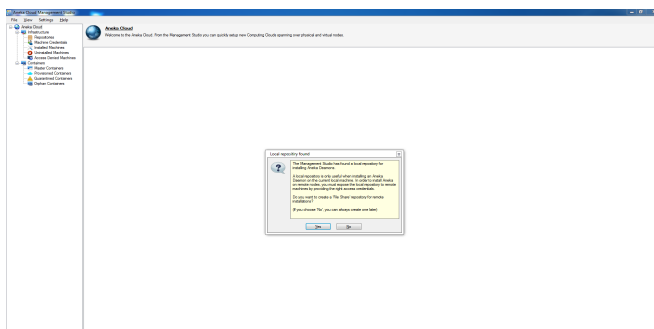
Installation Complete, click **Close** to finish:



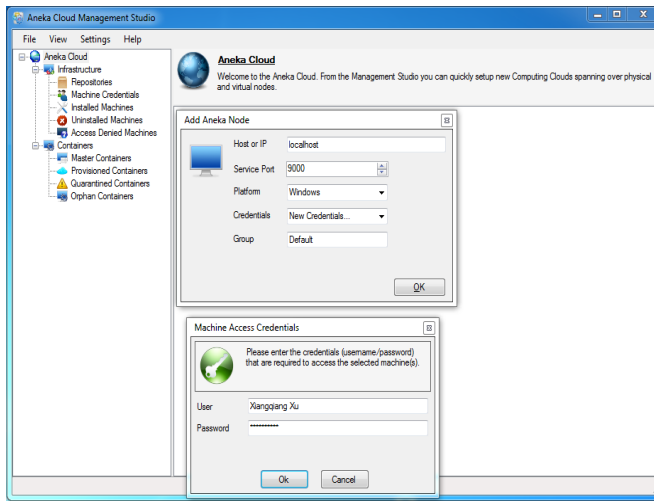
5. Launch Aneka Platform, I suggest that you can create a shortcut, so you do not have to search and click the icon every time you use. Click **OK** to continue.



Click **NO** to continue, we can configure our local repository later.



Click File→ Add Machine...



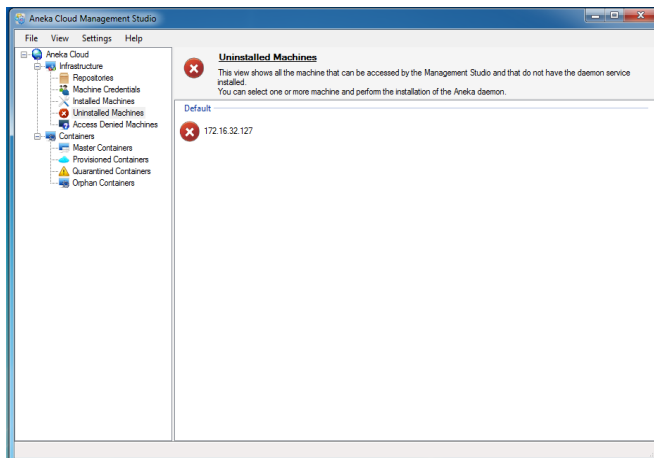
Host or IP: fill in localhost

Service Port: 9000

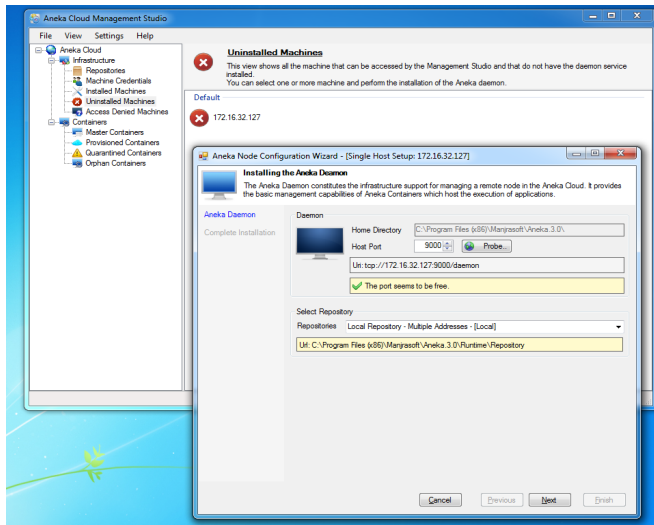
Platform: Windows

Credentials: In my case, User Name: Xiangqiang Xu User Password: *****

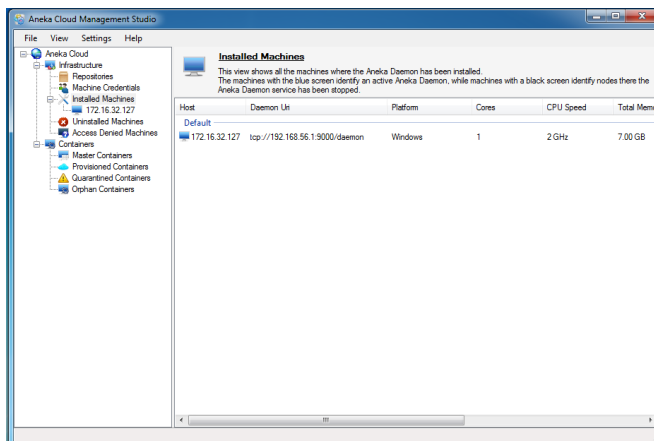
Click **OK** to continue. When you click Uninstalled Machine, you will see a similar case as below:



You need to install the machine on Aneka and configure it. Click the icon → right click → install



Then click **Next**, and then click **Finish**. It might take a few seconds to complete this step.

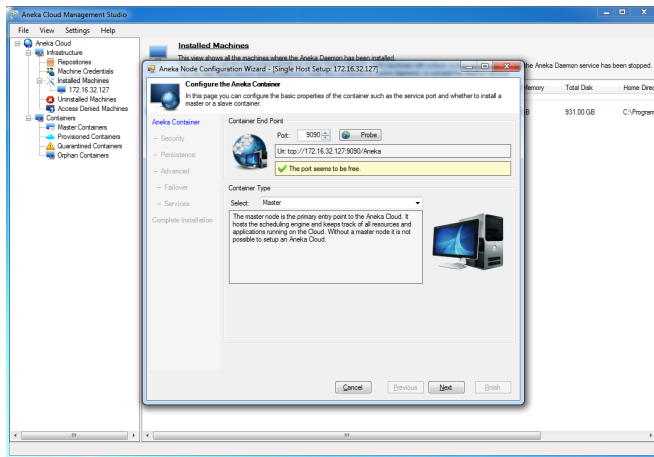


This is an example to show you how to add local machine to our Aneka cloud. We can also add other machines **within the same network**. (Make sure that can ping with each other successfully)

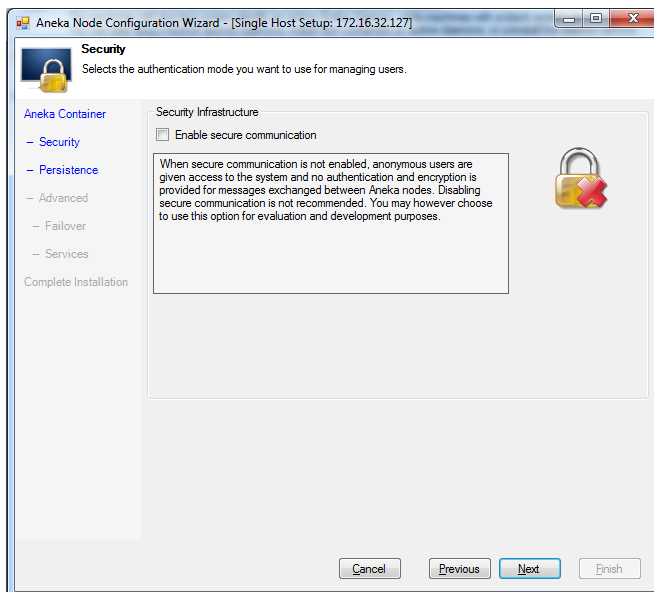
6. Install Master-Worker container.

6.1. Install one machine as both master container node and worker container node.

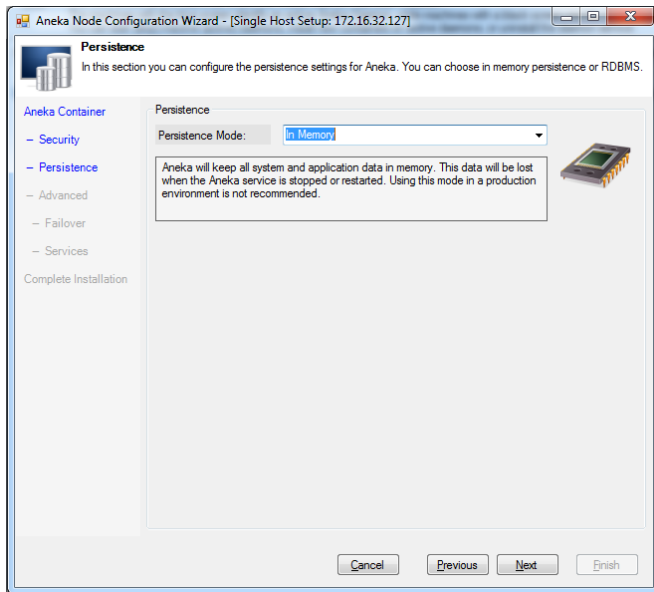
Click the host machine icon, and right click, then choose **Install Container**.



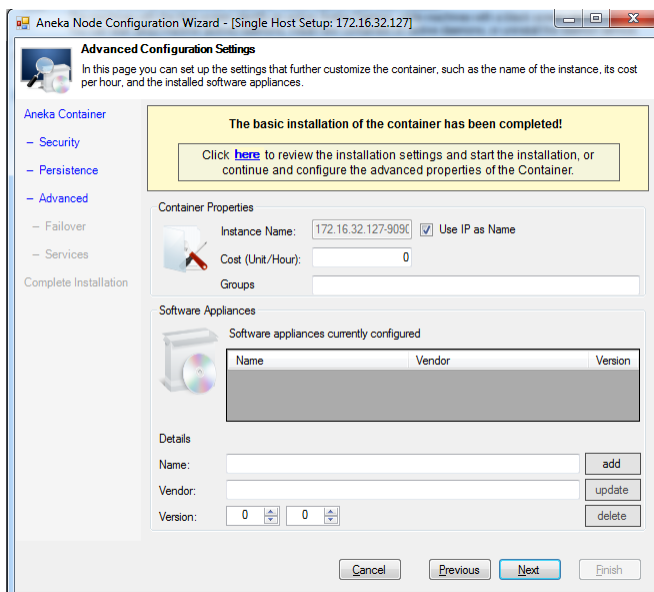
Click **Next**.



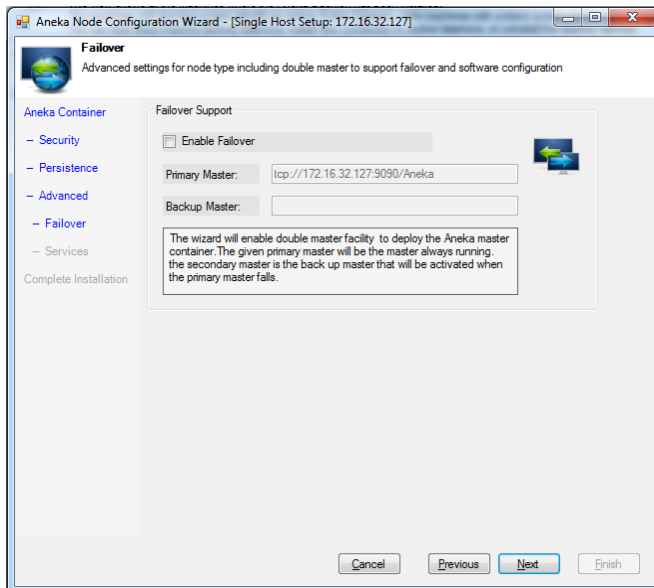
Click **Next**, and choose Persistence Mode as **In Memory**.



Click **Next**, do not worry about those blanks, you can just leave them blank there.

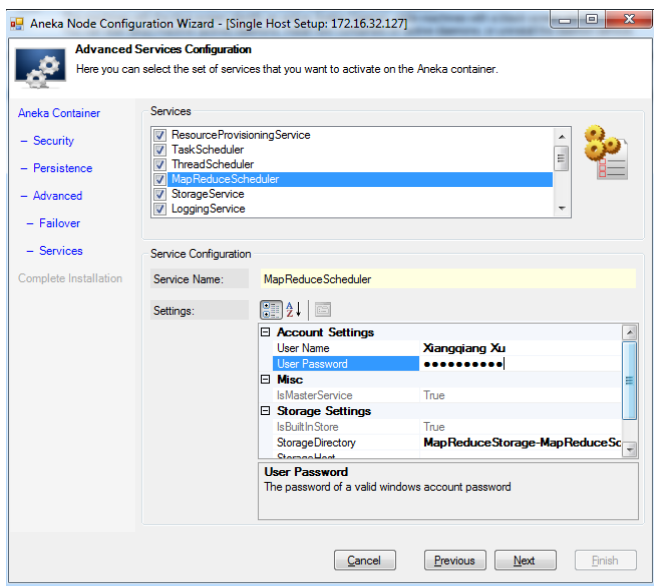


Click **Next**.

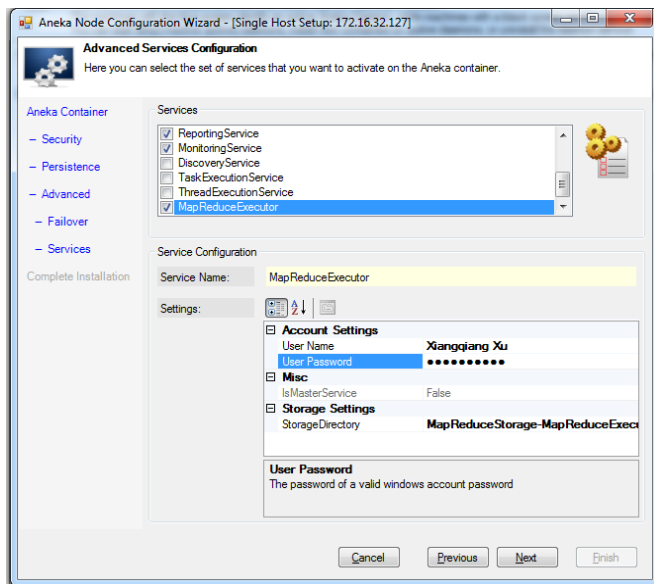


Click **Next**, we need to configure some information. I take MapReduce as an example here.

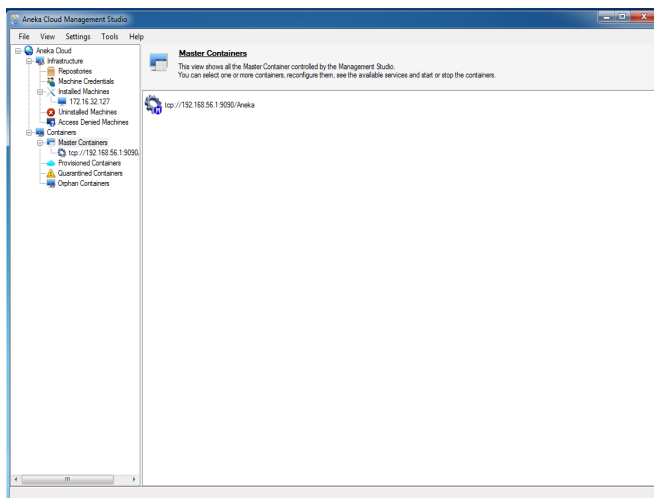
User Name and User Password are the same with your system username and password.



The step above aims to add the current machine as a MapReduce Scheduler. If you just use one machine in local, you can add this machine as a MapReuce Executer as well.

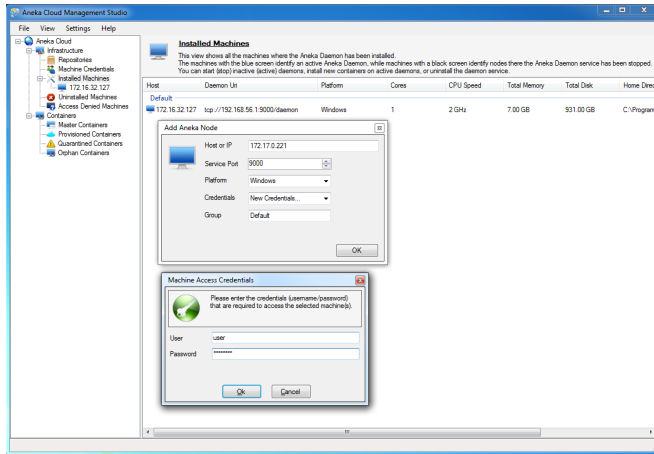


Click **Next** to finish the configuration. Here is what it looks like:



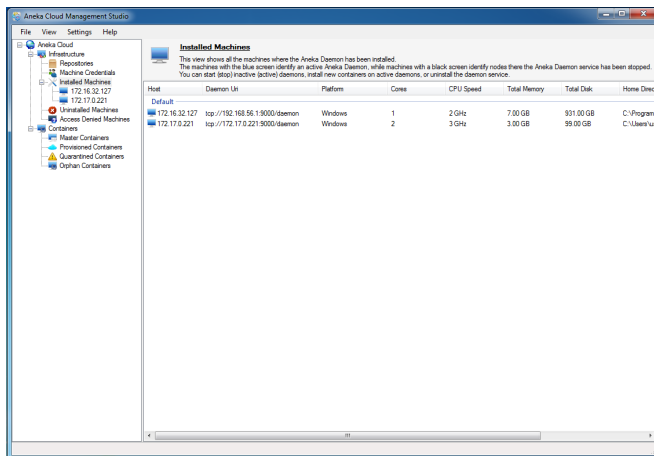
6.2. Install one machine as master container node, and install other machines as worker container nodes. (You can install multiple worker container nodes. Here I just install one worker container node as an example)

First, add a new machine with IP address (172.17.0.221) to our Aneka.

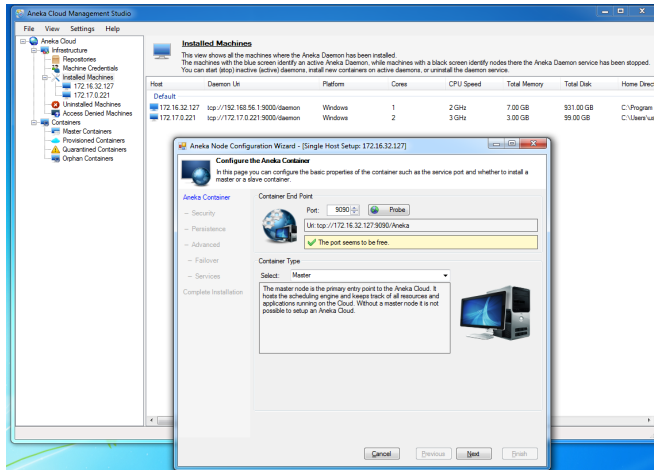


Click **OK** to continue to add it to Aneka. Then it should show up as follows:

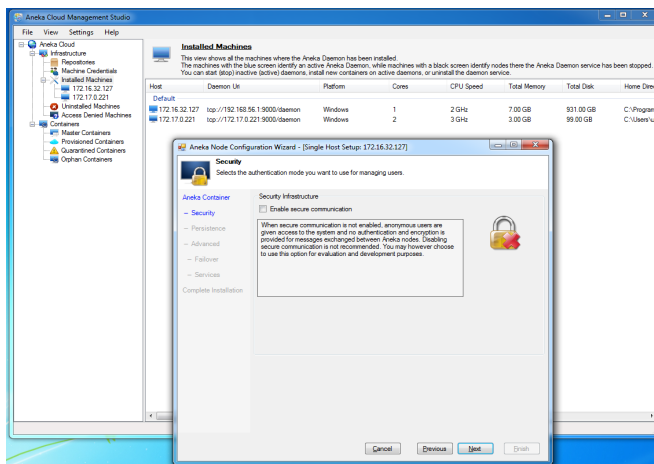
If the machine is grey, you can right click the icon, and click start to launch the machine.



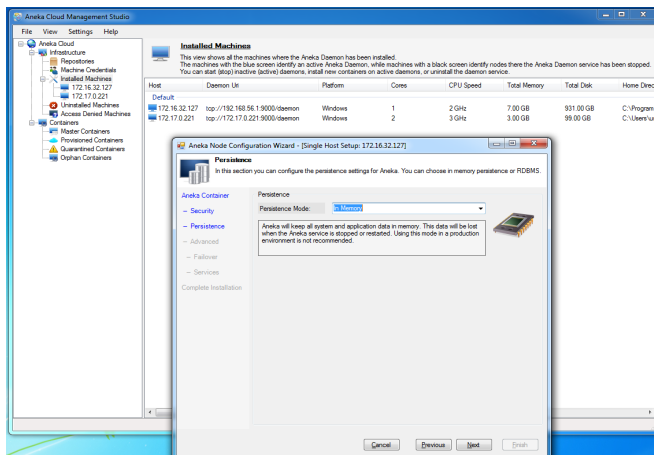
After that, install master container on one machine. Right click the machine icon, and click install container. Now the Container Type is **Master**.



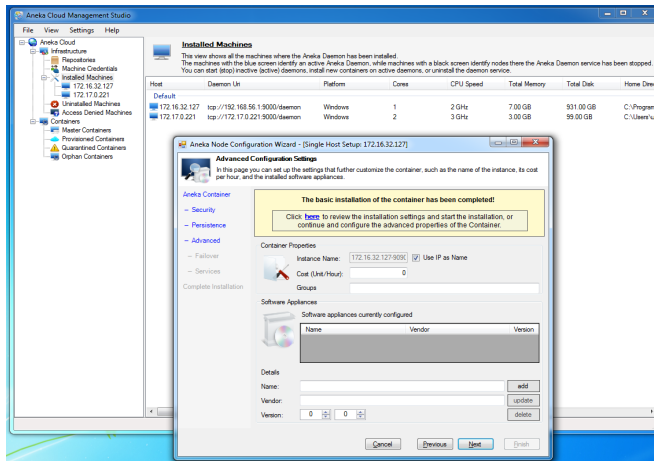
Click **Next**.



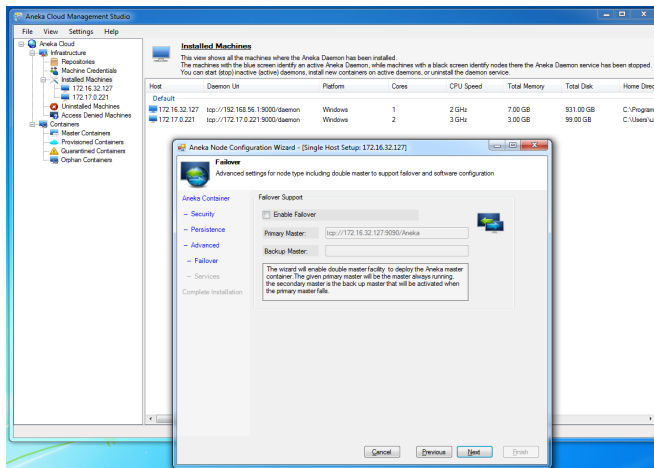
Click **Next**, and choose Persistence Mode as **In Memory**.



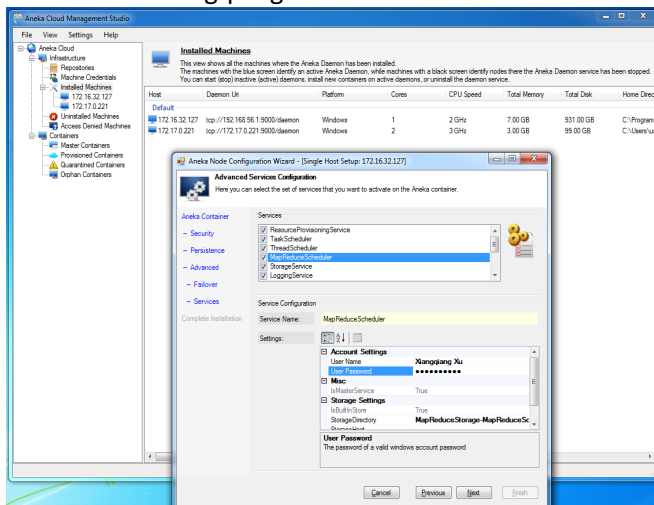
Click **Next**.



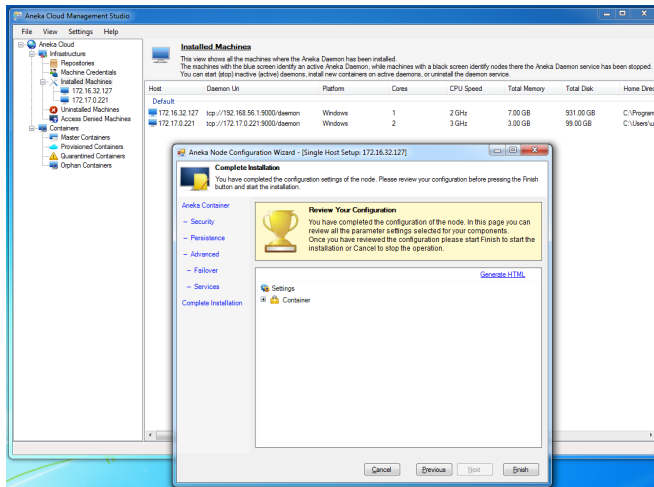
Click **Next** again.



Click **Next**, and configure the MapReduce Scheduler with User Name and User Password.
User Name: Xiangqiang Xu User Password: *****

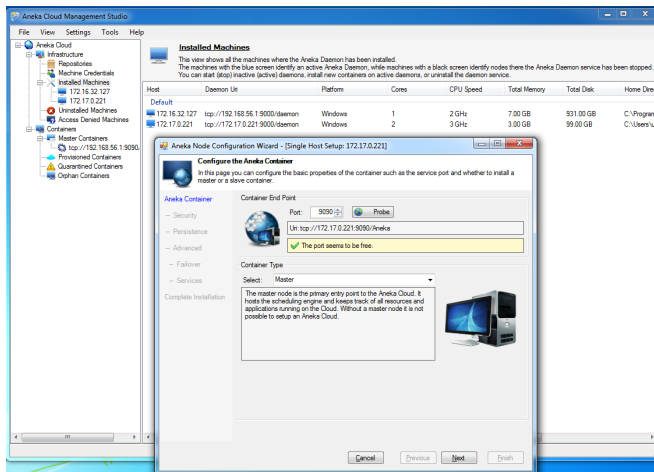


Click **Next**, then click Finish. Now, the master container has been installed.

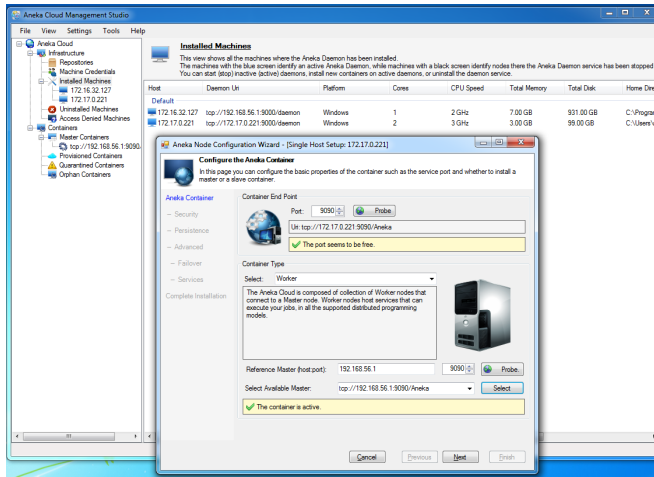


Next, install worker container with another machine based on the master container.

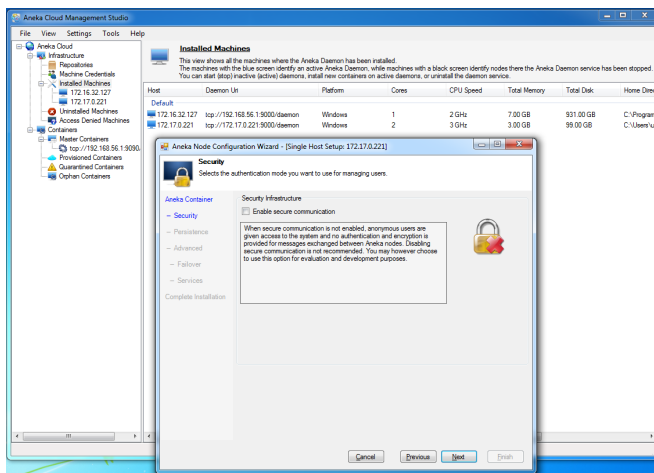
First, click another machine IP icon, and right click **Install Container**.



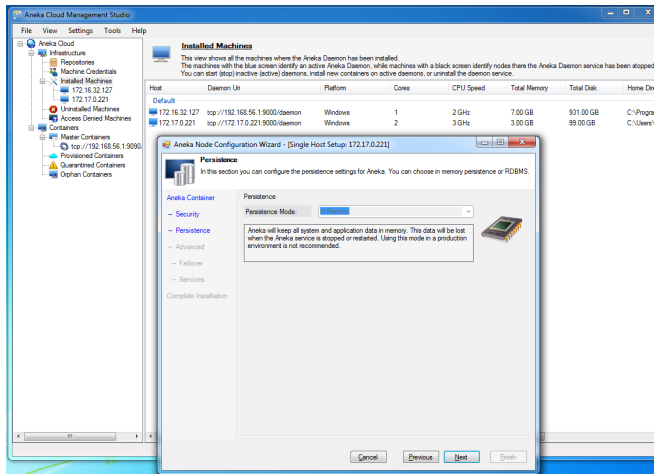
The worker container is built on top of the master container. Choose Container Type as **Worker**. Click **Select**. If ports are free and the container is active, that means the confirmation is correct. It shows up as follows:



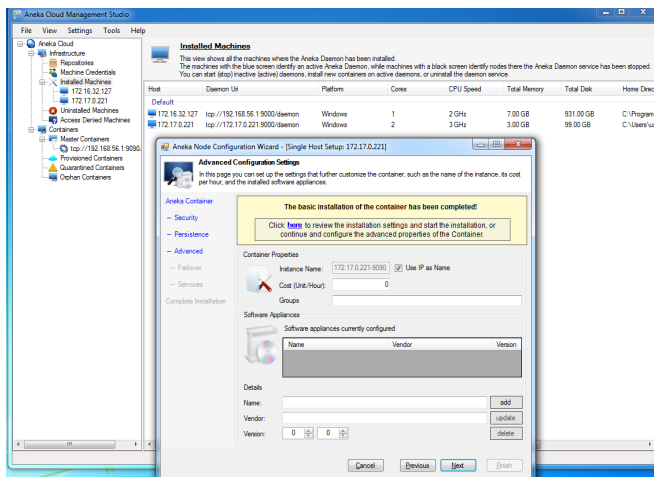
Click **Next** to continue.



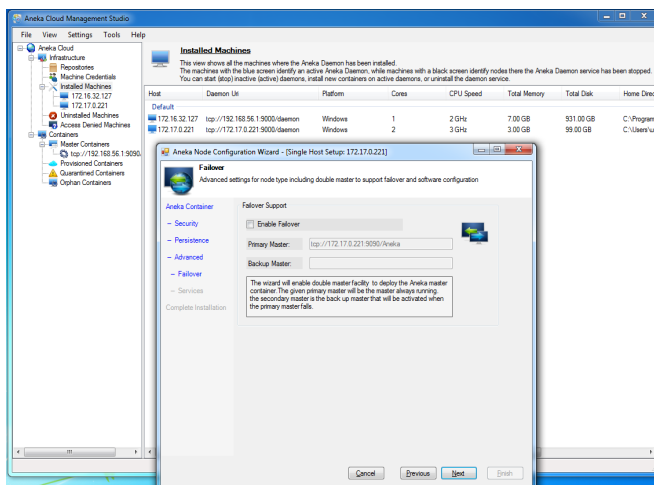
Click **Next** to continue.



Click **Next** to continue.

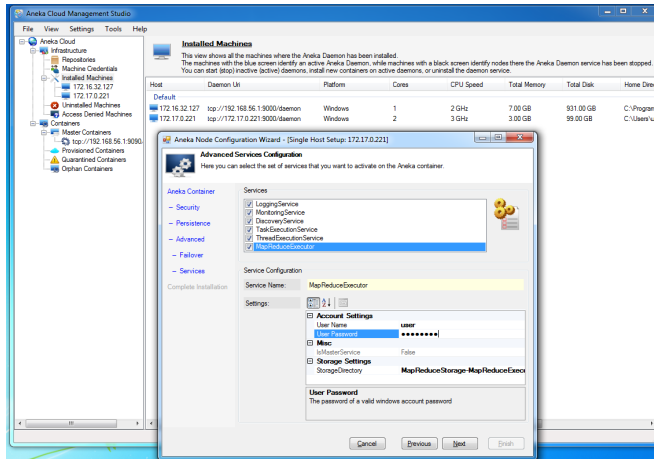


Click **Next**.

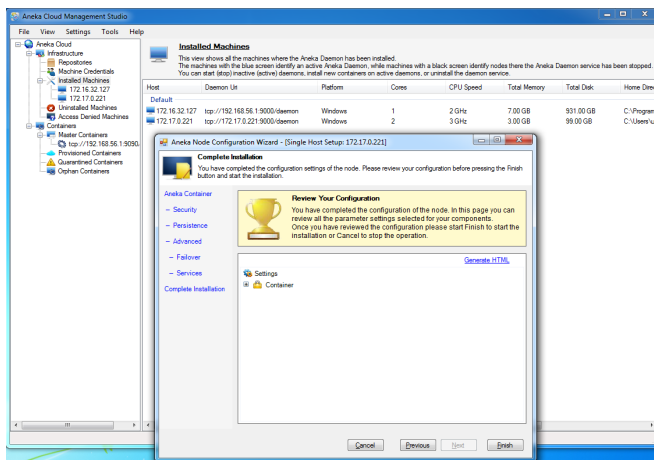


Click **MapReducerExecuter**, fill in the User Name and User Password.

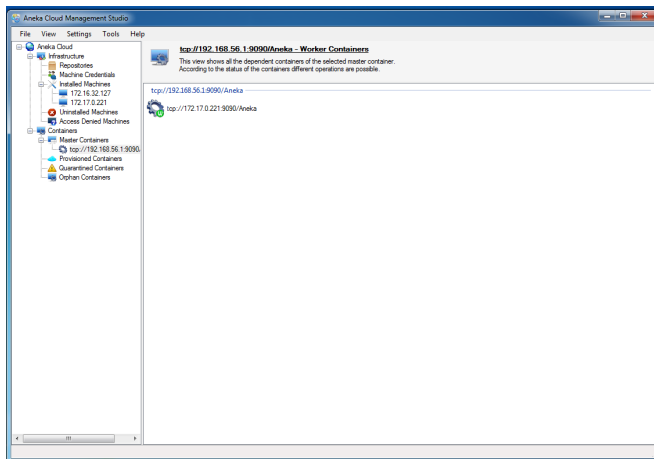
My case is User Name: **user** User Password: **userpass**



Click **Next**, then click **Finish**. Now, the master container has been installed.



Ok, now, both master container and worker container are installed successfully.



7. After installation, you can run MapReduce example code in the following directory:

C:\Program Files (x86)\Manjrasoft\Aneka.3.0\Examples\Tutorials\MapReduce Model\CSharp

Currently, we can code in C# or VB.NET for Aneka programs. I recommend to code in C#, which is very similar to Java. You can use Microsoft Visual Studio (I use Microsoft Visual Studio 2012 Professional) to run and code.

8. When you run example code, you need to add reference .dll to your code. Those .dll files can be found at: C:\Program Files (x86)\Manjrasoft\Aneka.3.0\Tools\SDK

Especially, for MapReduce model programming, those .dll files can be found at:

C:\Program Files (x86)\Manjrasoft\Aneka.3.0\Tools\SDK\Common

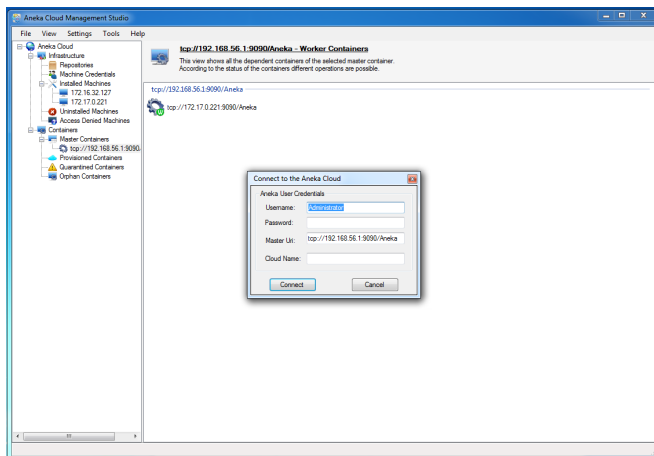
C:\Program Files (x86)\Manjrasoft\Aneka.3.0\Tools\SDK\MapReduce Model

9. Some related manuals and documents can be found at:

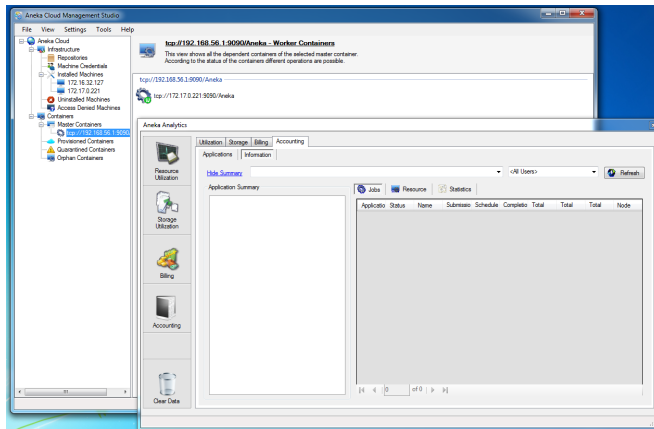
C:\Program Files (x86)\Manjrasoft\Aneka.3.0\Docs\Manuals

10. Besides, when you run examples, you can use Aneka Analytics to obtain more information:

Click **Aneka Cloud Management Studio** → **Tool** → **Connect**



Click **Connect**, then you can get more details about your running jobs.



11. For more details, you can read from the following links:

Installation Guide: <http://www.manjrasoft.com/download/3.0/AnekaInstallationGuide.pdf>

MapReduce Model Tutorial: <http://www.manjrasoft.com/download/3.0/MapReduceModel.pdf>

Aneka User Documents and Programming Models - Example Code:

http://www.manjrasoft.com/manjrasoft_downloads.html

12. Amazon EC2 Setup

There is a useful link about Amazon EC2:

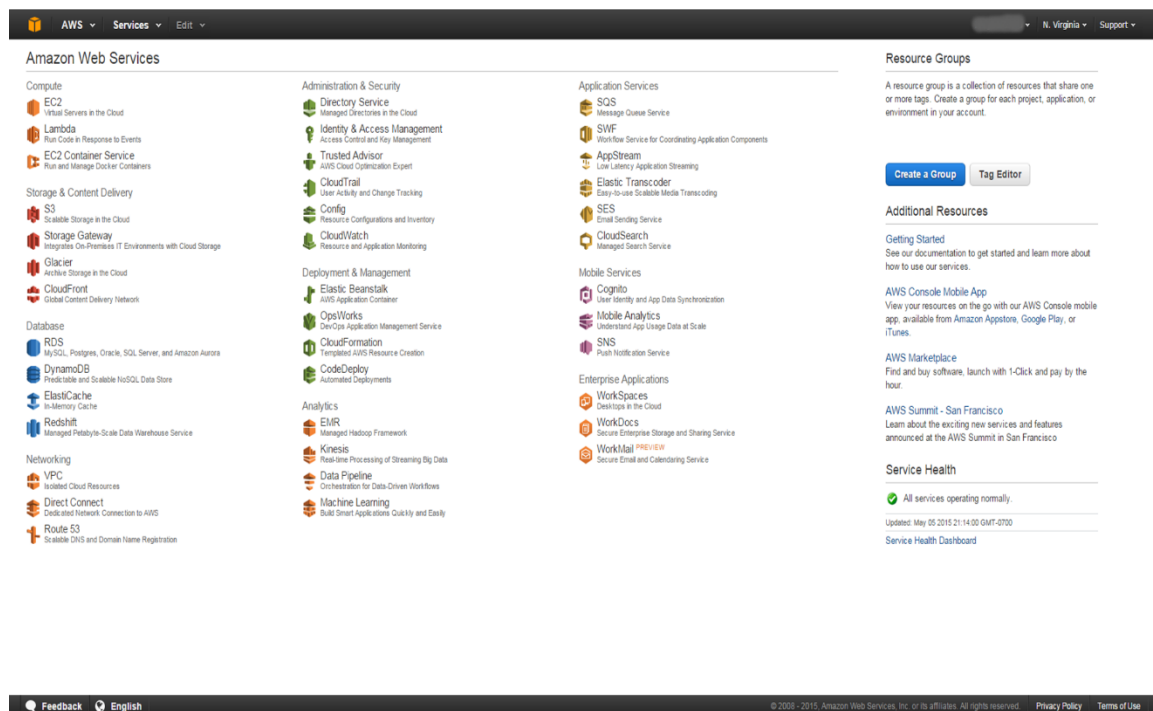
<https://aws.amazon.com/documentation/ec2>

If you use Microsoft Windows, the link bellow might be helpful:

<http://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/concepts.html>

Login from here: <https://aws.amazon.com>

Then you will see this panel:



Click the first EC2 icon:



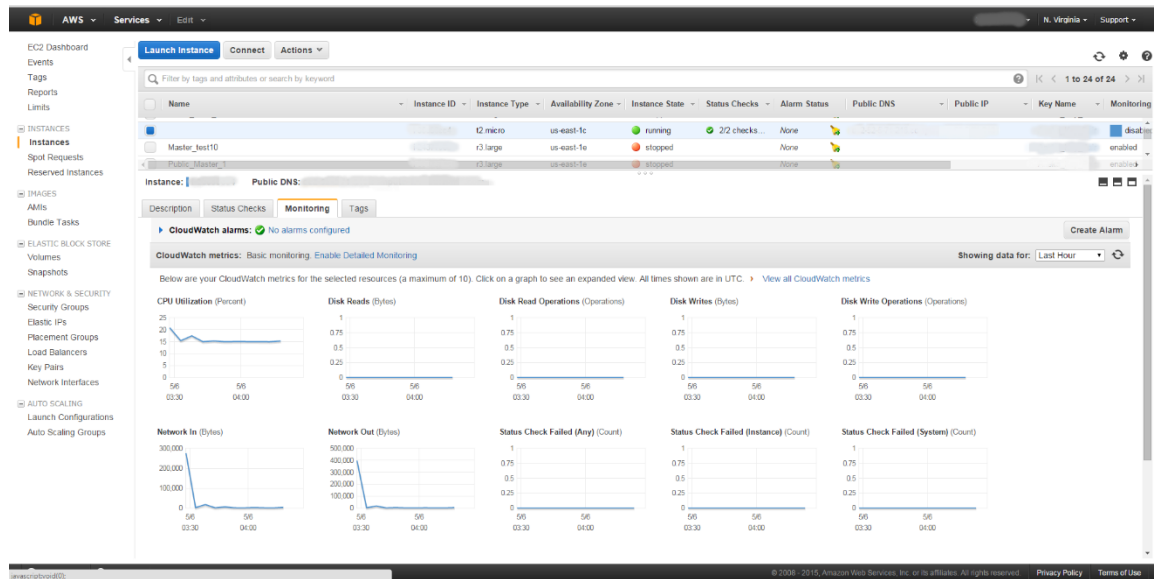
Then you can see this panel, you can launch new instance or start the current instance.

The screenshot shows the AWS Management Console for the EC2 service. The left sidebar contains navigation links for EC2 Dashboard, Events, Tags, Reports, Limits, INSTANCES, Spot Requests, Reserved Instances, IMAGES, AMIs, Bundle Tasks, ELASTIC BLOCK STORE, Volumes, Snapshots, NETWORK & SECURITY, Security Groups, Elastic IPs, Placement Groups, Load Balancers, Key Pairs, Network Interfaces, AUTO SCALING, Launch Configurations, and Auto Scaling Groups. The main content area displays a table of EC2 instances. The table has columns for Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS, Public IP, Key Name, and Monitoring. The instances listed include Master_test2, Master_test1, Public_Node_2, Master_test10, Public_Master_1, Master_test5, Master_test6, Master_test12, Master_test7, Amazon Aneka Container, Worker01, Aneka Worker, Aneka Master, Master_test8, Master_test9, and Public_Worker_2. The instances are in different states: stopped, running, and disabled.

You can get more detailed information if you look at the bottom of the webpage:

The screenshot shows the detailed view of an EC2 instance in the AWS Management Console. The instance is Master_test10, which is in the running state. The view shows details such as Instance ID, Instance state, Instance type, Private DNS, Private IPs, Secondary private IPs, VPC ID, Subnet ID, Network interfaces, Source/dest. check, EBS-optimized, Root device type, Root device, Block devices, Public DNS, Public IP, Elastic IP, Availability zone, Security groups, Scheduled events, AMI ID, Platform, IAM role, Key pair name, Owner, Launch time, Termination protection, Lifecycle, Monitoring, Alarm status, Kernel ID, and RAM disk ID.

Also, below are your CloudWatch metrics for the selected resources.



Here is some simple explanation of related parameters:

- (1). AMIs: you can backup OS image or launch clone a new instance base on the image.
- (2). Volumes: storage size you can set up.
- (3). Security Groups: you can configure different security rules. Then each instance can be assigned to different Security Groups if you want.
- (4). Elastic IPs: since every time you start a new instance, or you restart an instance, its IP address will change. You can associate a static IP address to the instance, so that your IP address will not be dynamic.
- (5). Key Pairs: You need Key Pairs to login the instance, and decrypt to get instance password.

Note: If you just want to stop the AWS service for a while, click the corresponding instance, and right click, and choose stop. Then you will not be charged of hourly fees. And your data and information will be kept for you.

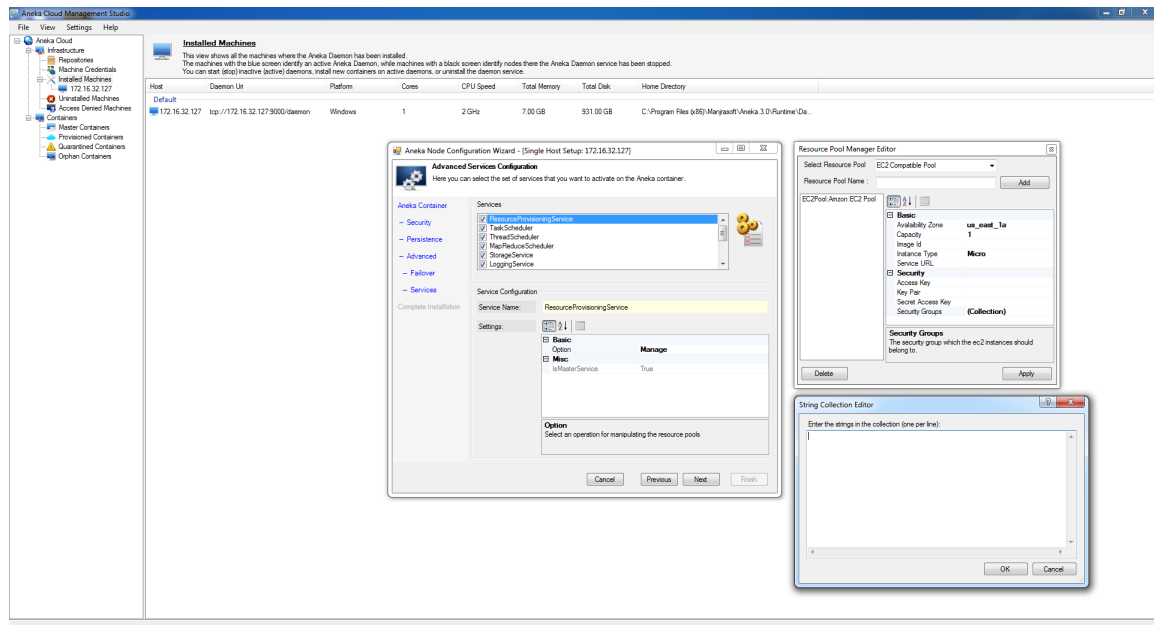
But if you want to permanently stop the instance, you can click the corresponding instance, and right click, and choose terminate. In this case, the instance will be recycled, and all your data will be removed. **BE CAREFULLY USING TERMINATE!**

Appendixes - 1

- Q&A about Dynamic Provisioning on Aneka -

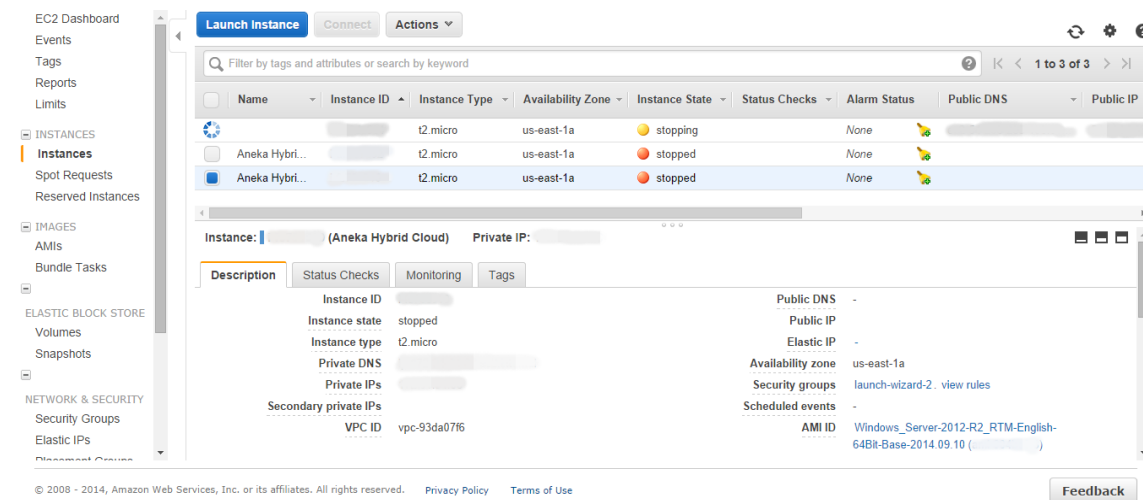
Here are some QAs for Aneka Dynamic Provisioning and the red texts below are the answer.

(**Note:** More detailed steps can be seen from the attached video which shows how to setup Resource Manager Pool and how to create Aneka hybrid cloud on Amazon EC2.)



Q1. Image ID: do I need to fill in Instance ID such as **i-ab12c345**, or AMI ID such as **Windows_Server-2012-R2_RTM-English-64Bit-Base-2014.09.10 (ami-123ab4c5)**, or AMI ID the value in brackets such as **ami-123ab4c5**? See the screenshot below.

A: The AMI ID such as **ami-123ab4c5**.

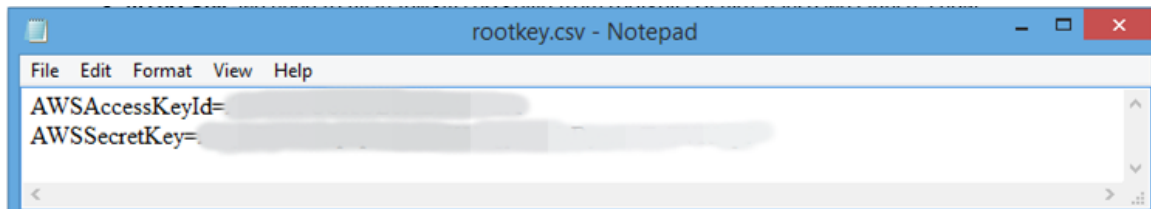


Q2. Service URL: our Available Zone is **us-east-1a**, so just leave it blank should be fine, right?

A: Yes.

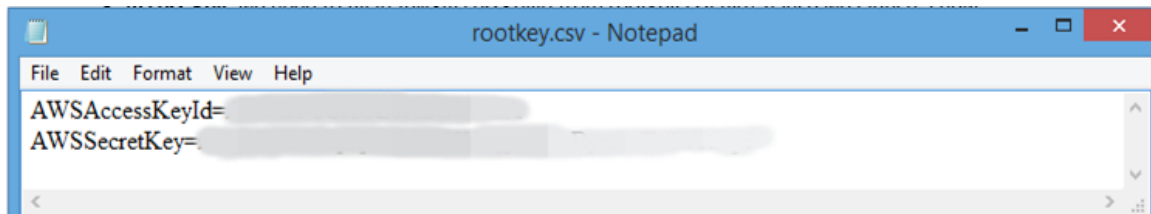
Q3. Access Key: do I need to fill in **AWSAccessKeyId** such as **XXXXXXXXXXXXXXXXXXXX** from **rootkey.csv** file? (Once we launch a new instance, we can download a **rootkey.csv** file). See the screenshot below.

A: Yes.



Q4. Secret Access Key: do I need to fill in **AWSSecretKey** such as **XX** from **rootkey.csv** file? (Once we launch a new instance, we can download a **rootkey.csv** file). See the screenshot below.

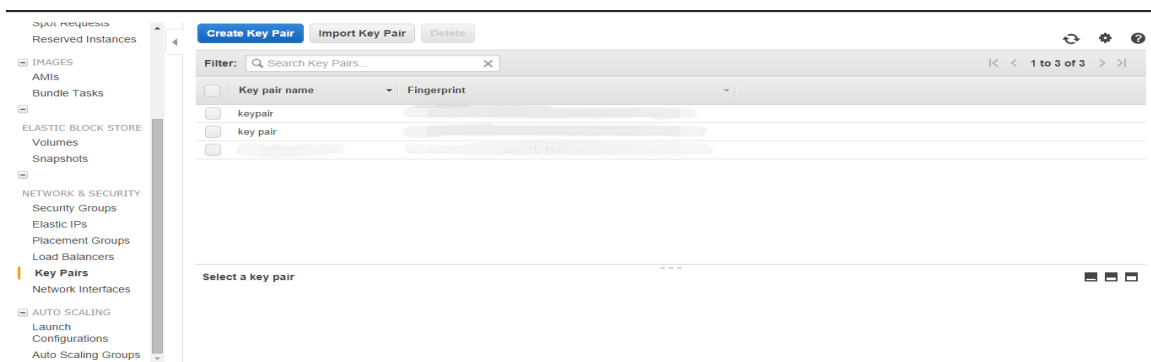
A: Yes.



Q5. Key Pair: do I need to fill in the value we need to fill in is **Key pair name** or **Fingerprint**?

For example, **Key pair name** is **Aneka Hybrid Cloud**

Fingerprint is **db:1a:a1:12:1b:1c:2a:b3:7c:45:67:89:bb:1a:11:12:1a:2b:d3:45**



A: Key Pair, but this is not compulsory.

Q6. Security Groups: do I need to fill in Group ID such as **sg-1abcd234** or **Group Name** such as **launch-wizard-2**? See the screenshot below.

A: Group Name.

The screenshot displays the AWS Management Console interface for the 'Security Groups' page. The left-hand navigation pane shows the 'NETWORK & SECURITY' section with 'Security Groups' selected. The main content area features a 'Create Security Group' button and an 'Actions' dropdown. Below this is a search bar and a table of existing security groups. The table has five columns: 'Name', 'Group ID', 'Group Name', 'VPC ID', and 'Description'. It lists five security groups: 'launch-wizard-2', 'launch-wizard-3', 'launch-wizard-1', 'default', and 'Aneka'. Each group has a corresponding VPC ID of 'vpc-93da07f6'. Below the table, there is a prompt to 'Select a security group above'.

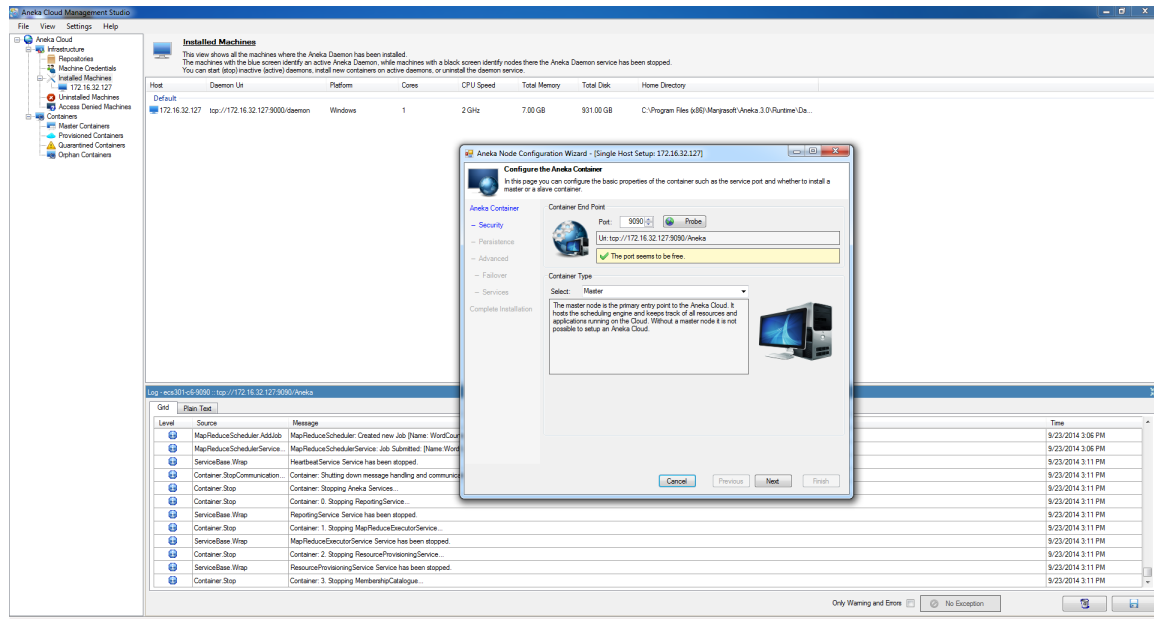
Name	Group ID	Group Name	VPC ID	Description
launch-wizard-2	sg-1abcd234	launch-wizard-2	vpc-93da07f6	launch-wizard-2 created 2014-09-23T18:28:52.504-07:00
launch-wizard-3	sg-1abcd234	launch-wizard-3	vpc-93da07f6	launch-wizard-3 created 2014-09-28T16:54:33.192-07:00
launch-wizard-1	sg-1abcd234	launch-wizard-1	vpc-93da07f6	launch-wizard-1 created 2014-09-23T12:36:07.811-07:00
default	sg-1abcd234	default	vpc-93da07f6	default VPC security group
Aneka	sg-1abcd234	Aneka	vpc-93da07f6	Hybrid

Appendixes - 2

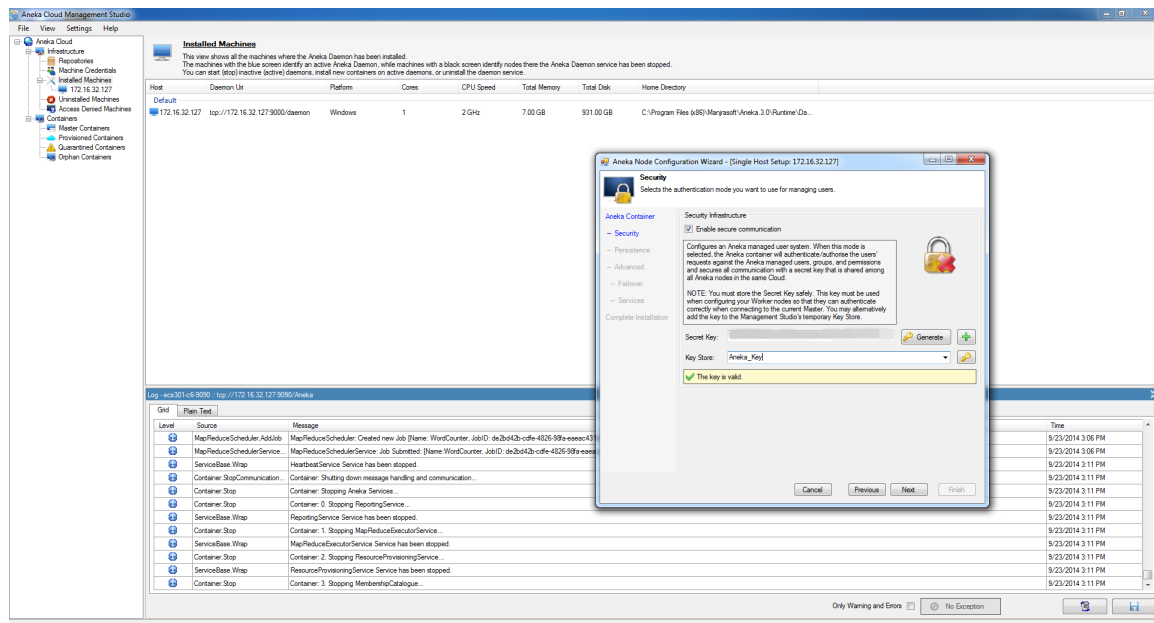
- How to setup and configure Dynamic Provisioning on Aneka? –

(**Note:** More detailed steps can be seen from the attached video which shows how to setup Resource Manager Pool and how to create Aneka hybrid cloud on Amazon EC2.)

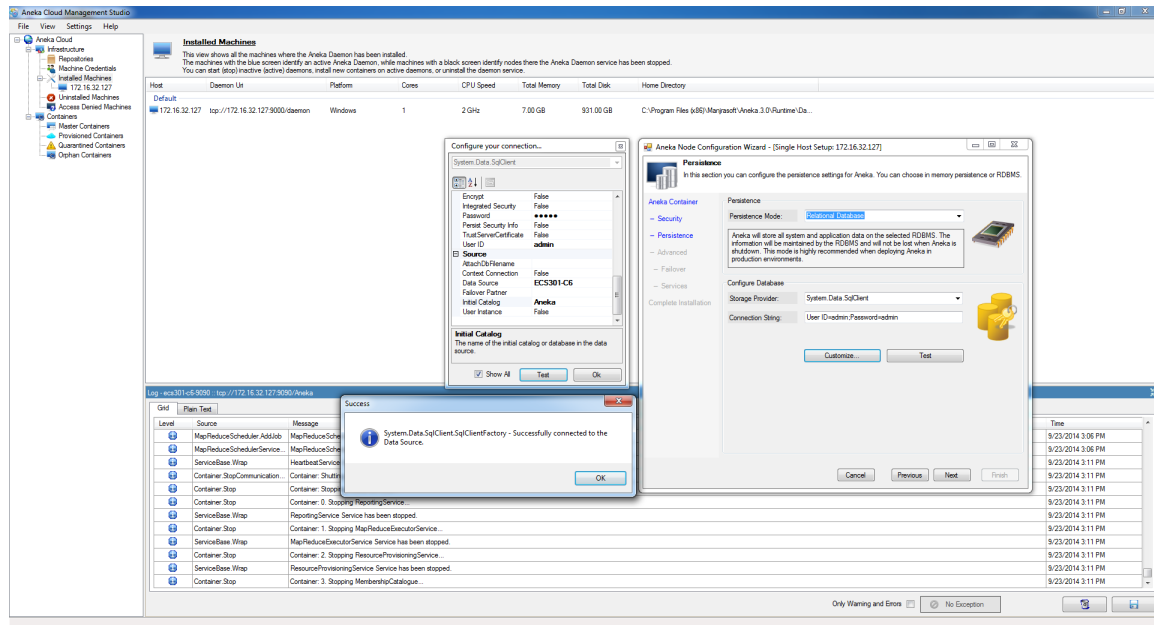
Step 1. Configure the Aneka Container.



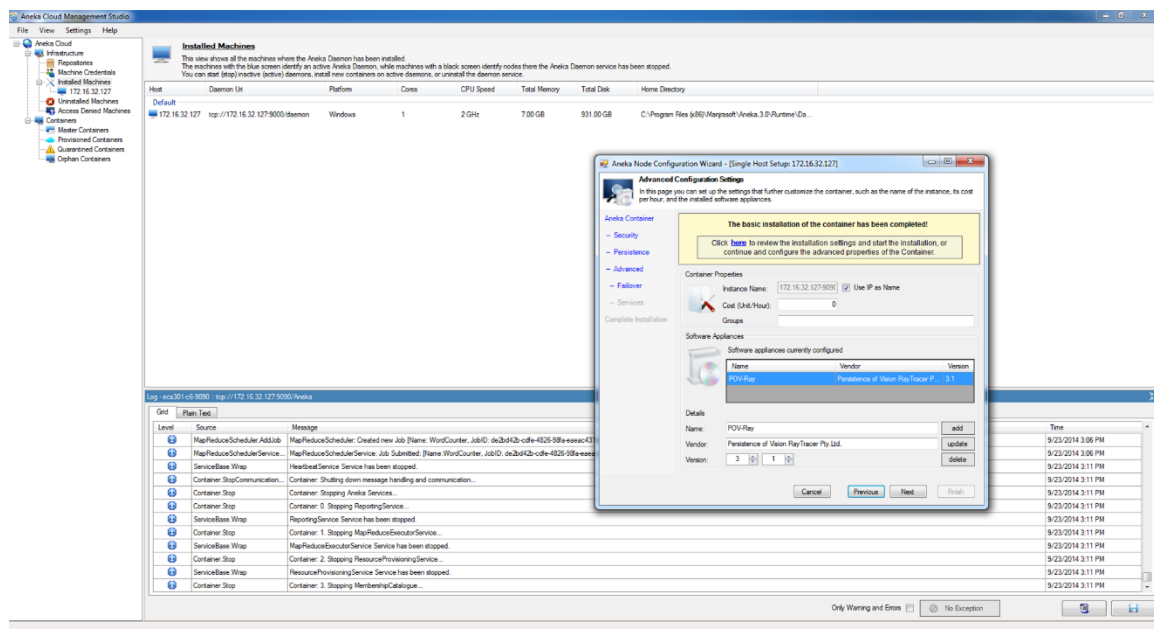
Step 2. Security.



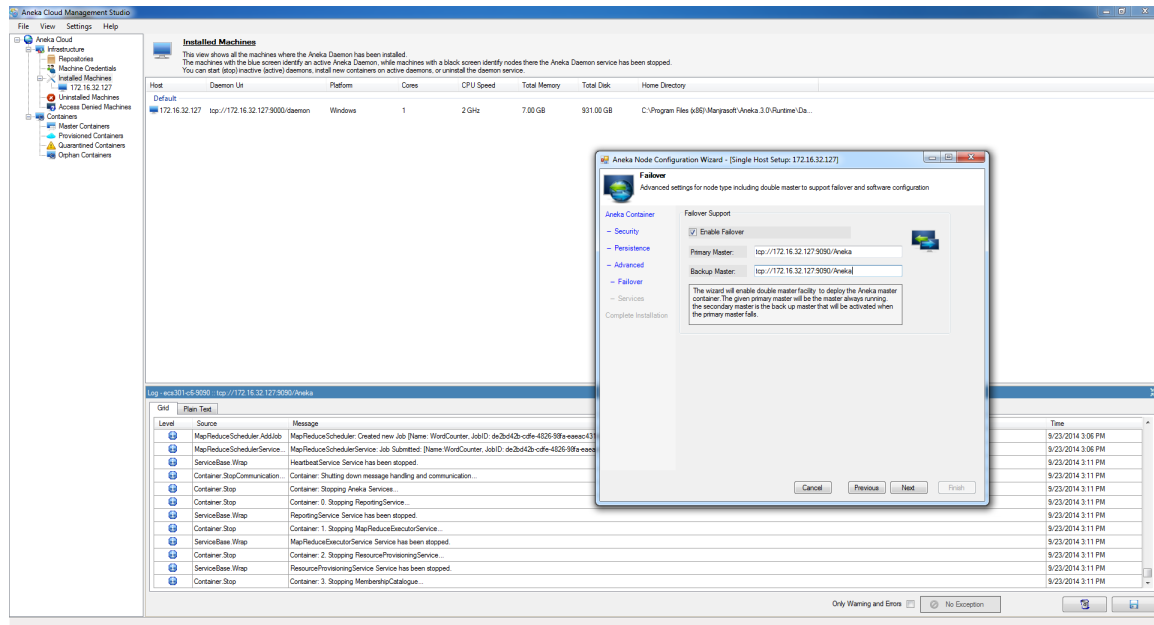
Step 3. Persistence.



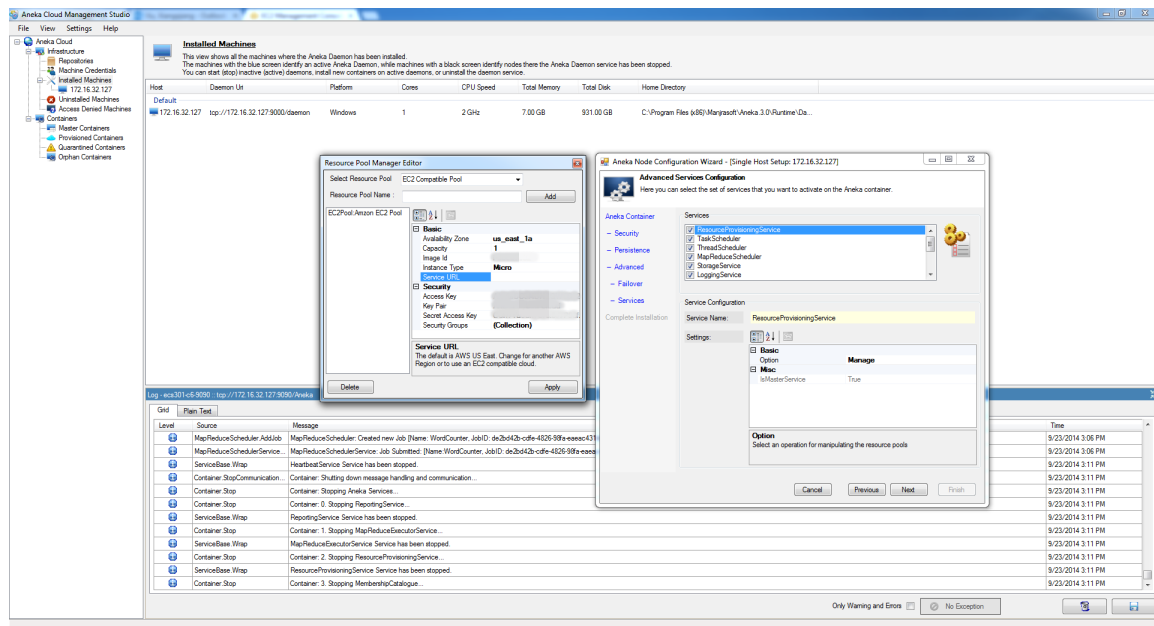
Step 4. Advanced Configuration Settings.



Step 5. Failover.



Step 6. Advanced Service Configuration -> Resource Provisioning Service -> Resource Pool Manager Editor



The screenshot displays the Anka Cloud Management Studio interface. The top menu bar includes File, View, Settings, and Help. The left sidebar shows a tree view with categories like Infrastructure, Resources, Machine Credentials, Installed Machines, and Containers. The main window is divided into several panels:

- Installed Machines:** A table listing installed machines. The first machine is named '172.16.32.127' and is in the 'Default' state. It is a 'Windows' platform with 1 core, 2 GHz CPU speed, 7.00 GB memory, and 931.00 GB disk space. The home directory is 'C:\Program Files (x86)\Mangosoft\Anka 3.0\Runtime\De...'. Below the table, a note states: 'The view shows all the machines where the Anka Daemon has been installed. The machines with the blue screen identify on active Anka Daemon, while machines with a black screen identify those where the Anka Daemon service has been stopped. You can start (stop) inactive (active) daemons, install new containers on active daemons, or uninstall the daemon service.'
- Resource Pool Manager Editor:** A dialog box for editing a resource pool. It shows the 'Basic' tab with fields for 'Resource Pool Name' (set to 'ec2pool'), 'Availability Zone' (set to 'us-east-1a'), 'Capacity' (set to '1'), 'Image ID' (set to 'Micro'), 'Instance Type' (set to 'Micro'), 'Service URL', 'Access Key', 'Key Pair', 'Secret Access Key', and 'Security Groups' (set to '(Collection)'). There is also a 'Security Groups' section with a description: 'The security group which the ec2 instances should belong to.'
- Anka Node Configuration Wizard:** A wizard for configuring an Anka node. It shows the 'Advanced Services Configuration' step. Under 'Anka Container', the 'Services' section has checkboxes for 'ResourceProvisioningService' (checked), 'TaskScheduler' (checked), 'ThreadScheduler' (checked), 'MapReduceScheduler' (checked), 'StorageService' (checked), and 'LoggingService' (checked). The 'Service Configuration' section shows 'Service Name' as 'ResourceProvisioningService' and 'Settings' as 'Basic' (selected), 'Option', and 'Micro'. The 'Option' section has a 'Manage' button and a 'True' checkbox for 'isMasterService'.
- String Collection Editor:** A small dialog box for editing a string collection. It has a 'Plan Test' button and a 'String Collection Editor' title. The collection name is 'launch-wizard-1' and the string is 'default/Anka/1'.

The bottom status bar shows 'Only Warning and Errors' and 'No Exception'.

The screenshot displays the AWS Cloud Management Studio interface. On the left, the 'Anketa Cloud' sidebar shows a tree view with 'Infrastructure' expanded, containing 'Regions', 'Machine Credentials', 'Installed Machines', and 'Access Denied Machines'. The 'Installed Machines' tab is active, showing a table of installed machines. Below the table, a log viewer displays the output of the 'log_ecc301c6-9090' command, showing the progress of the 'Anketa Node Configuration Wizard'.

Installed Machines

This view shows all the machines where the Anketa Daemon has been installed. The machines with the blue screen identify an active Anketa Daemon, while machines with a black screen identify nodes where the Anketa Daemon service has been stopped. You can start (stop) inactive (active) daemons, install new containers on active daemons, or uninstall the daemon service.

Host	Daemon Uri	Platform	Cores	CPU Speed	Total Memory	Total Disk	Home Directory
Default							
172.16.32.127	tcp://172.16.32.127:9000/daemon	Windows	1	2 GHz	7.00 GB	\$31.00 GB	C:\Program Files (x86)\Marjosef\Anketa 3.0\Runtime\Ds...

Anketa Node Configuration Wizard - [Single Host Setup: 172.16.32.127]

Complete Installation

You have completed the configuration settings of the node. Please review your configuration before pressing the Finish button and start the installation.

Review Your Configuration

You have completed the configuration of the node. In this page you can review all the parameter settings selected for your components. Once you have reviewed the configuration please start Finish to start the installation or Cancel to stop the operation.

[Generate HTML](#)

Settings

Container

Complete Installation

Buttons: Cancel, Previous, Next, Finish

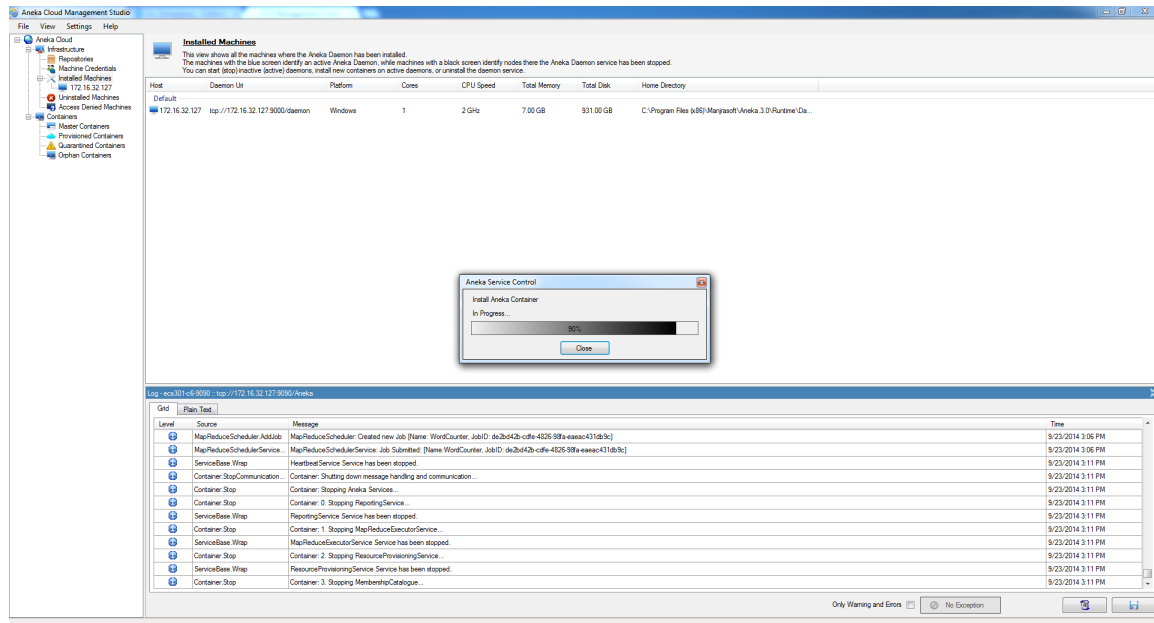
Log: ecc301c6-9090 - [tcp://172.16.32.127:9000/anketa]

Std	Plan Test
Level	Source
Level <td>Message</td>	Message
1	MapReduceScheduler: AddJob
1	MapReduceScheduler: Job Submitted [Name: WordCounter, JobID: dc2b42b-cdfc-4325-69fa-ea43c1f1e1e1]
1	ServiceBase: Wap
1	Container: Shutting down message handling and communication...
1	Container: Stop
1	Container: Stopping Anketa Services...
1	Container: Stop
1	Container: Stopping ReportingService...
1	ServiceBase: Wap
1	Container: Stop
1	Container: Stopping MapReduceExecutorService...
1	ServiceBase: Wap
1	Container: Stop
1	Container: Stopping ResourceProvisioningService...
1	ServiceBase: Wap
1	Container: Stop
1	Container: Stopping MembershipCatalogue...

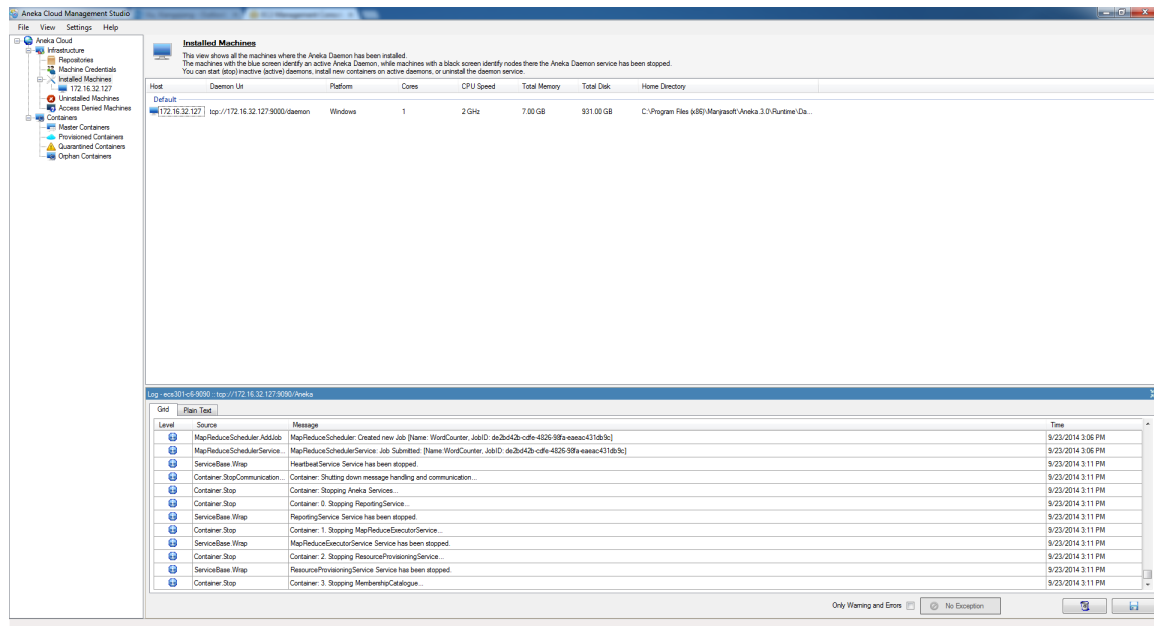
Time: 9/23/2014 3:06 PM, 9/23/2014 3:06 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM, 9/23/2014 3:11 PM

Only Warning and Errors [X] [X] No Exception

Step 9. Install Aneka Container in process.

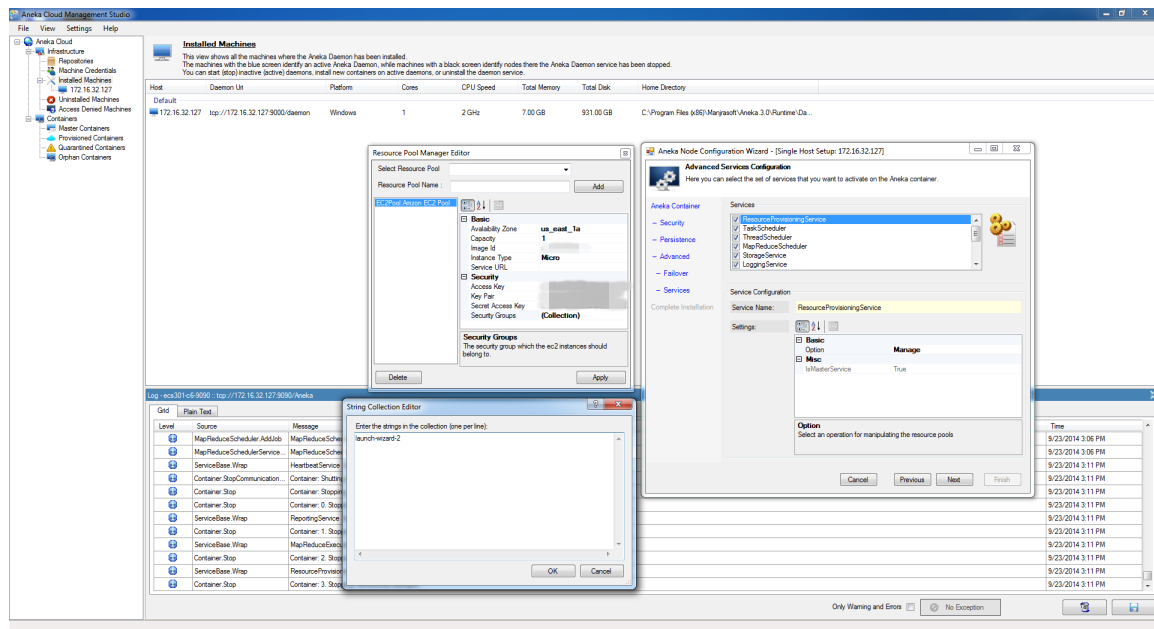


Step 10. Complete installation without any notification/error, but no Master Container appears.

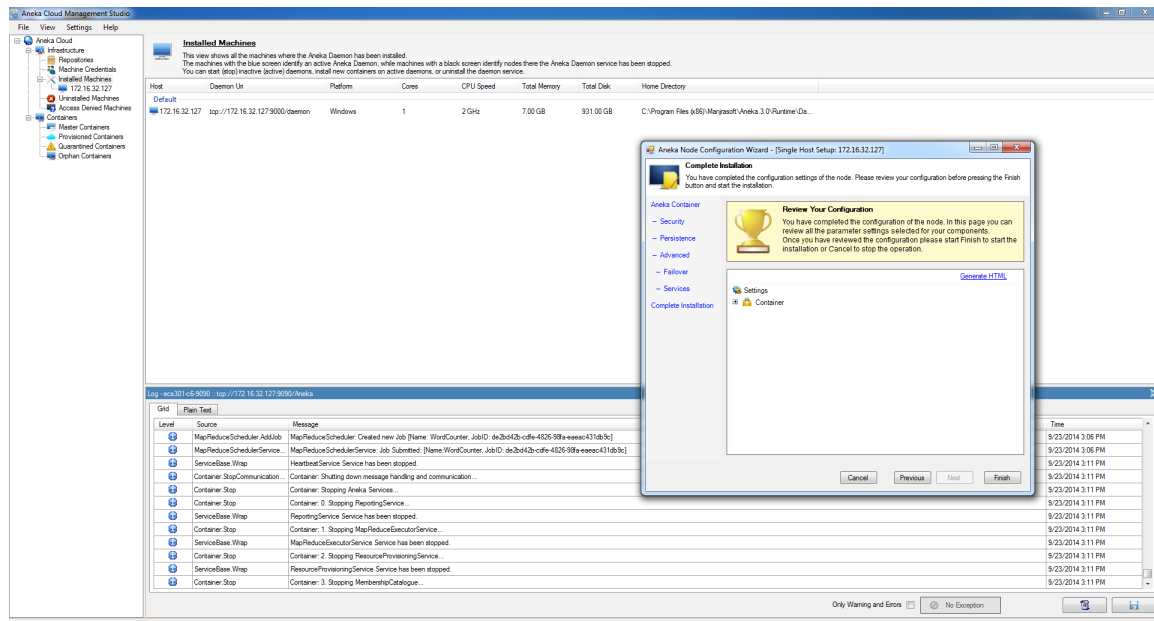


Also, I tried to the whole process again by only changing Image ID showed in Step7 to ami-904be6f8 showed in step 11. The previous steps are the same, and step 11-14 are the following steps after changing Image ID.

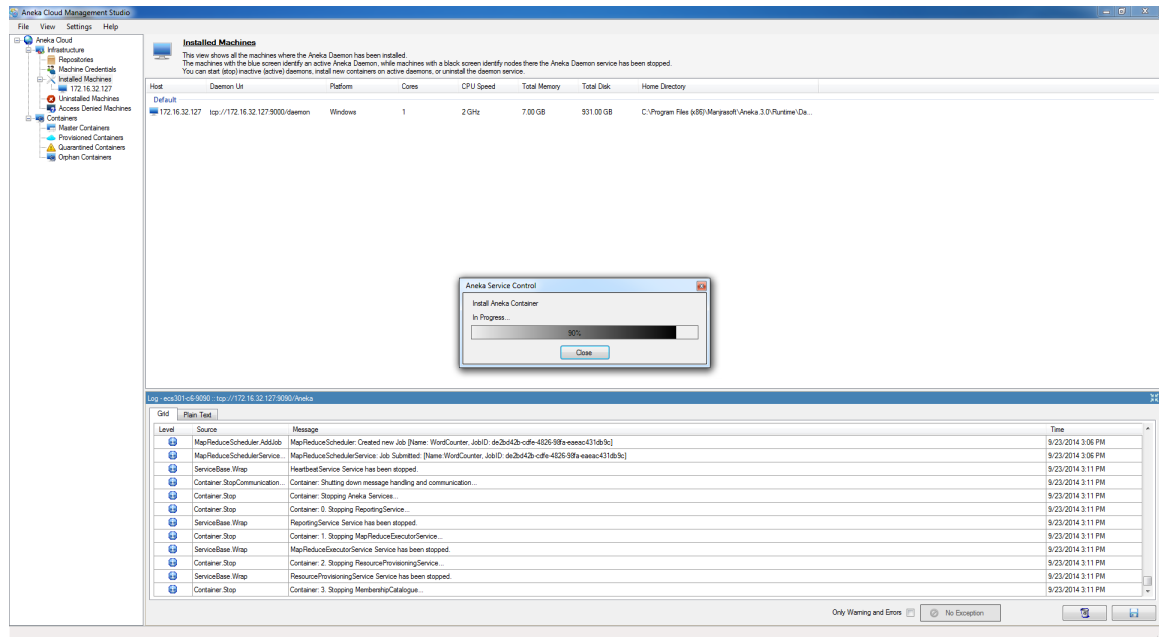
Step 11. Advanced Service Configuration -> Resource Provisioning Service -> Resource Pool Manager Editor -> Security Group (Collection)



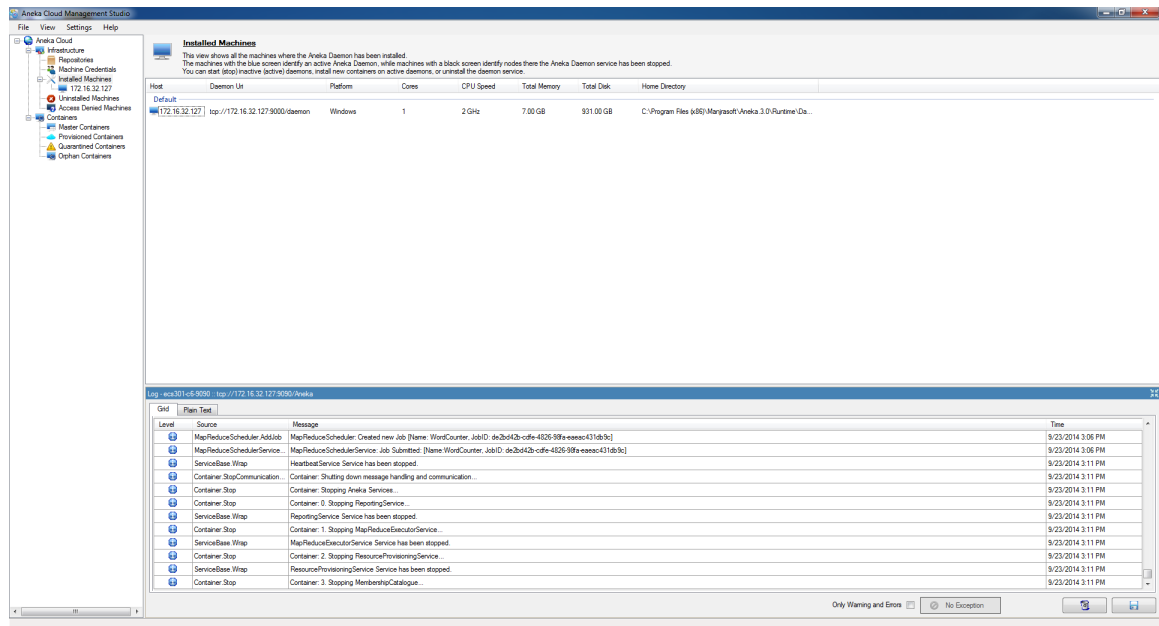
Step 12. Completion Installation.



Step 13. Install Aneka Container in process.



Step 14. Complete installation without any notification/error, but no Master Container appears.



AWS-info 1 to AWS-info 4 is our specific AWS account set-up information including Instances, Image ID, Key Pairs, Security Groups, Access Key ID and Secret Access Key:

AWS-info 1. Instances.

The screenshot shows the AWS Management Console interface for the EC2 service. The left sidebar contains navigation links for various AWS services. The main content area displays the 'Instances' page. At the top, there are tabs for 'Launch Instance', 'Connect', and 'Actions'. Below these is a search bar and a table of instances. The table has columns for Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS, Public IP, Key Name, Monitoring, and Launch Time. One instance, 'Aneka Hybrid', is highlighted. To the right of the table, the details for the selected instance are shown. These details include the Instance ID, Instance state (running), Instance type (t2.micro), Private DNS, Private IPs, Secondary private IPs, VPC ID, Subnet ID, Network interfaces, Source/dest. check, EBS-optimized, Root device type, Root device, Block devices, Public DNS, Public IP, Elastic IP, Availability zone, Security groups, Scheduled events, AMI ID, Platform, IAM role, Key pair name, Owner, Launch time, Termination protection, Lifecycle, Monitoring, Alarm status, and Kernel ID.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS	Public IP	Key Name	Monitoring	Launch Time
Aneka Hybrid	i-12345678	t2.micro	us-east-1a	stopped	2/2 checks...	None			Aneka Hybrid	disabled	September 23, 2014 6:29:10

Instance: i-12345678 Public DNS: ec2-54-92-37-100.us-east-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID: i-12345678
Instance state: running
Instance type: t2.micro
Private DNS: ec2-54-92-37-100.us-east-1.amazonaws.com
Private IPs: 54.92.37.100
Secondary private IPs: -
VPC ID: vpc-935a07b6
Subnet ID: subnet-d500c7f
Network interfaces: eni0
Source/dest. check: True
EBS-optimized: False
Root device type: ebs
Root device: /dev/sda1
Block devices: /dev/sda1

Public DNS: ec2-54-92-37-100.us-east-1.amazonaws.com
Public IP: 54.92.37.100
Elastic IP: -
Availability zone: us-east-1a
Security groups: launch-wizard-2, view rules
Scheduled events: No scheduled events
AMI ID: Windows_Server-2012-R2_RTM-English-64Bit-Base-2014.09.10
Platform: windows
IAM role: -
Key pair name: -
Owner: -
Launch time: September 23, 2014 6:29:10 PM UTC-7 (less than one hour)
Termination protection: False
Lifecycle: normal
Monitoring: basic
Alarm status: None
Kernel ID: -

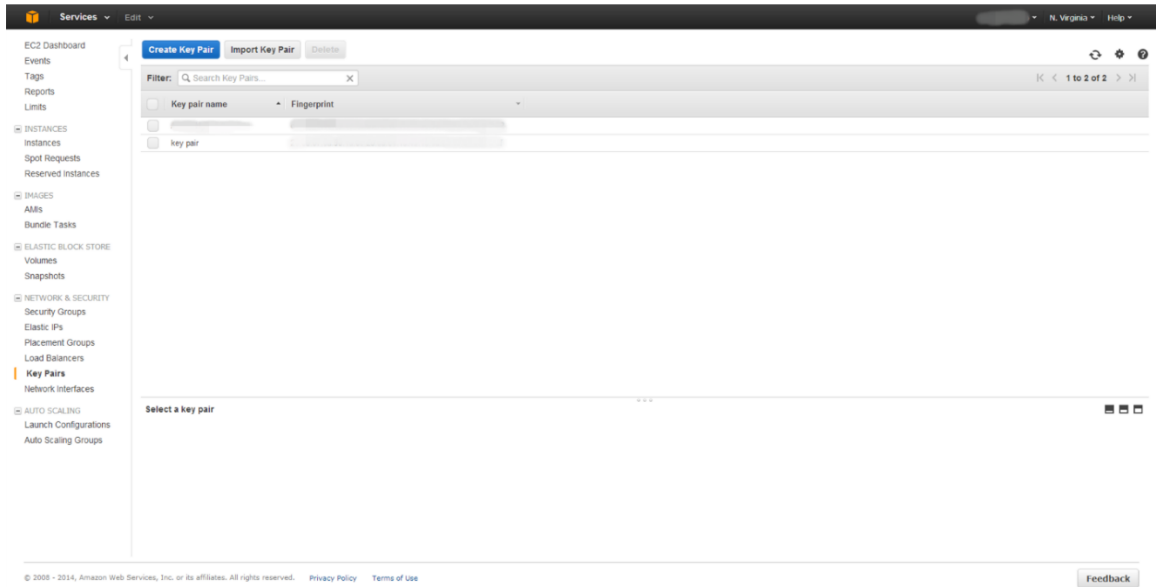
AWS-info 2. Security Groups.

The screenshot shows the AWS Management Console interface for the Security Groups page. The left sidebar contains navigation links for various AWS services. The main content area displays the 'Security Groups' page. At the top, there are tabs for 'Create Security Group' and 'Actions'. Below these is a search bar and a table of security groups. The table has columns for Name, Group ID, Group Name, VPC ID, and Description. Four security groups are listed: 'launch-wizard-2', 'launch-wizard-1', 'default', and 'Aneka'. To the right of the table, the details for the selected 'Aneka' security group are shown. These details include the Group ID, Group Name, VPC ID, and Description.

Name	Group ID	Group Name	VPC ID	Description
launch-wizard-2	sg-12345678	launch-wizard-2	vpc-935a07b6	launch-wizard-2 created 2014-09-23T18:28:52.504-07:00
launch-wizard-1	sg-12345679	launch-wizard-1	vpc-935a07b6	launch-wizard-1 created 2014-09-23T12:36:07.811-07:00
default	sg-1234567a	default	vpc-935a07b6	default VPC security group
Aneka	sg-1234567b	Aneka	vpc-935a07b6	Hybrid

Select a security group above

AWS-info 3. Key Pairs.



AWS-info 4. Security Credentials.

